Tara Alvarez

Professor and Director, Undergraduate Biomedical Engineering Program at New Jersey Institute of Technology

Newark, NJ, US

Professor Alvarez conducts neuroscience research for helping patients recover their vision and for diagnosing other visual diseases.

Biography

Tara Alvarez, Ph.D., professor of biomedical engineering, is conducting neuroscience research that could help stroke victims recover their vision but also lead to diagnosis of other visual diseases. Alvarez seeks to understand how the brain learns when visually locating objects in three-dimensional (3D) space. Understanding the learning strategies that the human brain uses to control eye movement will also yield insight into the general problem of motor learning. Her research will lead to a better understanding of basic motor control and also discover how dysfunctions in the eyes? three-dimensional tracking system affect motor learning. In 2005, the National Science Foundation (NSF) awarded Alvarez an NSF Career Award. Alvarez is using part of her NSF grant to enhance the Vision and Neural Engineering Laboratory at NJIT and to design new courses for undergraduates in NJIT?s expanding biomedical engineering program. In addition, Alvarez has developed a one-week course for NJIT?s pre-college FEMME program which teaches grade-school girls, most of whom are minorities, the fundamentals of science, technology and pre-engineering concepts. Alvarez?s research will help people with a visual problem called convergence insufficiency, or the inability to easily fixate the eyes on a near target. A person with convergence insufficiency cannot read or look at a computer screen for more than twenty minutes without getting headaches as well as blurred and double vision. The condition has also been linked to learning disabilities. And as societies become more dependent on prolonged and close-up visual tasks such as computer use, there will be more of a need to help people with such vision problems.

Areas of Expertise

Vision Therapy, Virtual Reality, Vision, Neuroscience, Biomedical Engineering

Affiliations

Vision and Neural Engineering Laboratory, Oculomotor Technologies, CSO

Education

Rutgers University
Ph.D. Biomedical Engineering

Rutgers University
M.S. Biomedical Engineering

Rutgers University
B.S. Biomedical Engineering

Accomplishments

Fellow of the American Academy of Optometry
Alvarez joined approximately 300 fellows, who are the leading scientists and clinicians in the field, at an induction ceremony at the academy?s 2019 annual meeting in Orlando, Fla. At the conference, she gave a talk on the neural mechanisms underlying a vision therapy that helps patients with a disorder known as convergence insufficiency (CI) to read and focus clearly on close objects. That research was recognized by the academy as among the ?10 most newsworthy of 2019.?

Auggie Award: Most Innovative Breakthrough
The use of virtual reality to change disparity (offset between left and right eye) programmed in a novel way that is patent-pending way which leads to a long term change of the vergence (how we see in depth) system. Our team has filed for an international patent application entitled "Method, system, and apparatus for treatment of binocular dysfunctions."

Auggie Award: Women XR Laureate
Honoring a a female researcher or project manager leading an industry-academia collaborative project. Awarded to Dr. Tara Alvarez as head of the VERVE project.

NJIT Excellence in Research
Tara Alvarez, a professor of biomedical engineering who studies the links between visual disorders and the brain and develops novel devices to identify and treat them, was awarded NJIT?s Excellence in Research Prize and Medal from the Board of Overseers.

Edison Patent Award
NJIT and inventors Tara Lynn Alvarez Ph.D. (NJIT) and Bérangère Granger (Essilor International S.A.) received an Edison Patent Award in the biomedical technology category for ?Method for Determining the Acceptance of Progressive Addition Lenses? (U.S. Patent 8,814,361). The invention establishes a methodology by which a clinician can identify which people will easily adapt to Progressive Addition Lenses compared to those who will have a more difficult time.

Outstanding Woman Scientist of NJ
2008

NORA Founding Members Award for Science
2008

CAREER Award National Science Foundation
2005

NSF Reviewer
2006-Present

Sigma Xi: Research Honor Society
2002

Tau Beta Pi: Engineering Honor Society
1993
